

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY


(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 08 NOV 2005

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Applicant's or agent's file reference 304528WO/DJW		<b>FOR FURTHER ACTION</b>		See Form PCT/IPEA416
International application No. PCT/GB2004/005124		International filing date (day/month/year) 07.12.2004	Priority date (day/month/year) 09.12.2003	
International Patent Classification (IPC) or national classification and IPC H02M3/335				
Applicant NUJIRA LTD. et al.				
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau) a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>				
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>				
Date of submission of the demand  10.10.2005		Date of completion of this report  07.11.2005		
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized Officer  Roider, A  Telephone No. +49 89 2399-		



**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/GB2004/005124

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**Box No. 1 Basis of the report**

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1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

**Description, Pages**

1-19 as originally filed

**Claims, Numbers**

1-40 as originally filed

**Drawings, Sheets**

1/8-8/8 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing *(specify)*:
- ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing *(specify)*:
- ☐ any table(s) related to sequence listing *(specify)*:

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/GB2004/005124

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	5-15, 21-40
	No: Claims	1-4, 16-20
Inventive step (IS)	Yes: Claims	5-15, 21-40
	No: Claims	1-4, 16-20
Industrial applicability (IA)	Yes: Claims	1-40
	No: Claims	

2. Citations and explanations (Rule 70.7):

**see separate sheet**

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.

PCT/GB2004/005124

**Re Item V** Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1: High-Efficiency High-Level Modulator for Use in Dynamic Envelope Tracking  
CDMS RF Power Amplifiers, IEEE 2001

D2: Simple and Inexpensive High-Efficiency Power Amplifier Using New APT  
MOSFETs, APT 1994

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1 and 16 is not new in the sense of Article 33(2) PCT.

The document D1 discloses a voltage summer (Figures 2 and 3 on page 1510 and Figures 5 and 6 on page 1511) including a transformer ( $L_p$ ,  $L_s$ ) having a primary side ( $L_p$ ) and a secondary side ( $L_s$ ), where a first voltage ( $E_{L_p}$ ) to be summed is connected to the primary side and a second voltage ( $E_{L_s}$ ) to be summed is connected to the secondary side.

In deed, the "voltage summer" according to claim 1 modulates the dc voltage (224) applied to the secondary winding in response to the selected ac voltage (226) applied to the primary winding and, actually, is thus a modulator providing a modulated dc voltage at its output. The term "voltage summer" is technically correct but misleading because the "sum" of the voltages applied to the transformer windings is only instantaneous due to the frequency of the primary side ac voltage and is not the actual aim of the circuit. A time constant "sum" of the voltages is not intended by this circuit rather a dc voltage whose voltage level is dynamically adapted to an envelope by a selected ac voltage.

Since method claim 16 directly corresponds to claim 1 it equally lacks novelty in view of D1.

Document D2 anticipates the subject-matter of claims 1 and 16 in the sense of Article 33(2) PCT (see Figure 2 of D2).

The features contained in claims 2-4 and 17-20 are disclosed in D1.

Figure 7 of D1 shows a ring shaped transformer (Ls, Lp, Lx) which basically corresponds to the transformer claimed in claims 26 and 40. However, apparently neither an equal number of turns of the primary and secondary winding nor that each primary winding turn is closely coupled with a secondary winding turn can be derived from it. However, it should be made clear in claims 26 and 40 that the transformers are intended to be comprised in the voltage modulator according to claims 1-25, Article 6 PCT.

It is to be noted that claims 1 and 16 in its present general form are not allowable (lack of novelty in view of D1). Thus, an objection against lack of unity (PCT Rule 13) between claims 1-25 and claim 26-40 could have been risen because the common inventive concept is not present when one invention is not new. But taking into account that there is patentable subject-matter in the present application (see below) an objection against lack of unity has not been drawn up. Thus, it is suggested to amend claims 1 and 16 in accordance with the proposal made below to bring the application into an allowable form.

The idea of the present invention is to apply selected ac voltages to the primary winding of the transformer to modulate the dc voltage applied to the secondary winding in response to the selected ac voltage.

The selection of an ac voltage is performed in accordance with the result of a comparison of voltage or current signal representing the "summed" or modulated dc output voltage feedback to a difference means (244) or subtractor (264) which generates a control signal representing the difference between the feedback voltage or current signal. This control signal is input to a drive amplifier which generates the ac voltage applied to the primary winding in response to the control signal (Figures 5 and 6 of the present application).

An independent claim 1, and correspondingly claim 16 (method) which combined the present claim 1 with either the features of the voltage loop control (Figure 5) or those of the current loop control (Figure 6) would appear allowable in view of PCT Article 33 because it would provide the necessary technical distinction from the disclosure of D1.

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PCT/GB2004/005124

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D1 is not mentioned in the description, nor is this document identified therein.

The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).